

CLAMPING APPARATUS AND METHODS FOR MANUFACTURING

ABSTRACT OF THE DISCLOSURE

The present invention is directed to apparatus and methods for clamping around a manufacturing tool engaging a work piece. In one embodiment, a clamp includes a moveable support arranged to at least partially surround a circumference defining a work area. A friction reducing element is attached to the support to apply pressure to the surface when the clamp is engaged with the work piece, and to allow the clamp to be moved with the manufacturing tool. In accordance with other aspects of the invention, the clamp co-annularly or partially surrounds the manufacturing tool. In another embodiment, the manufacturing tool is a friction stir welding tool.

